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Editorial Preface

Usability: A Common Theme for Developments in e-Learning at the UK Open University

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This editorial preface highlights a selection of recent e-learning developments at the UK Open University with which the author has had direct involvement as a project leader or evaluator, and offers some reflections on progress and lessons learned. The three projects described are concerned with student use of course websites, e-books, and digital video. A common theme running through the projects is investigating and ensuring the usability of new technologies for teaching and learning.

INTRODUCTION

Open University courses are designed to give students the flexibility to study in their homes and workplaces. Courses use a range of media, and e-learning is understood quite broadly — it occurs “when digital media are used to create and present course materials and learning support” (<http://www.open.ac.uk/elearning/>). This means that e-learning is not only online and Web based; it includes other digital formats such as DVD and CD-ROM. The Open University is a leader in research concerned with educational applications of technology and student study experience, conducted within research groups across the University, in the Institute of Educational Technology (IET, <http://iet.open.ac.uk>),

and in the Knowledge Media Institute (KMI, <http://kmi.open.ac.uk>). Information and good practice in e-learning technologies is shared through the Knowledge Network (see public interface at <http://kn.open.ac.uk/public/>), a Web-based application that enables users to explore, share, and build knowledge and experience of teaching and learning, and aims to provide access to some of the lessons learned from the University’s 30-year collective experience in distance education.

Concept of Usability

Usable systems are generally regarded as being efficient, easy to learn, effective to use, and enjoyable or engaging from the user’s perspective. A decade ago, Preece et al. (1994) described usability as a key concept in Human-Computer Interaction, “concerned with making systems easy to learn and easy to use” (Preece et al., 1994, p. 14), and distinguishable from the notion of ‘user experience’, which encompasses a wider set of concerns such as creating systems that are satisfying, enjoyable, entertaining, helpful, or emotionally fulfilling. Gradually researchers have come to understand that to produce systems with good usability, it is

necessary to understand the psychological, ergonomic, organizational, and social factors that determine how people operate. In a subsequent book on 'interaction design', Preece et al. (2002) explain that this is defined as "designing interactive products to support people in their everyday and working lives." It entails "creating user experiences that enhance and extend the way people work, communicate, and interact" (Preece et al., 2002, p. v).

E-learning brings usability into a shared arena, highlighting the need for technical or design experts and academic experts to work together more closely than ever before to produce usable websites and software. Nielsen (2001) has remarked that although general usability standards apply equally to e-learning, there are additional considerations, for example the need to keep content fresh in learners' minds so that they do not forget things while trying to accommodate new concepts. Among researchers in educational applications of computing, Laurillard (2002) addresses issues of usability from a pedagogical perspective, focusing on three aspects: user interface, design of learning activities, and checking whether learning objectives have been met. She emphasizes that "the aim is to design an interface that never intrudes on the task in hand" (Laurillard, 2002, p. 194).

Usability of Course Websites

The Web has become a popular medium for the provision of course-related materials and tutorial support for distance, flexible, and self-access education, however issues of quality and usability in the context of educational websites are not, as yet, well understood. Although there are many guidelines relating to technical usability standards (e.g., Nielsen, 2003), technical usability is not the only aspect that needs to be consid-

ered. In our project at the Open University, run jointly between the Institute of Educational Technology and the Faculty of Education and Language Studies, we have developed the notion that there are several layers of usability, namely technical, general, academic, and context-specific (Muir, Shield, & Kukulska-Hulme, 2003). We have gone a long way toward refining our understanding of the academic and context-specific aspects, which include the broad context of e-learning, as well as contexts defined in terms of specific disciplines and the learning activities undertaken within those disciplines. Recently, we have been working with the concept of *pedagogical usability* — that is, usability as this affects educational website design and development, particularly in the context of supported open and distance learning (Shield & Kukulska-Hulme, 2003). A key aim of our project has been to enable academic and other course team members who develop courses to participate on an equal footing with other professionals (e.g., Web developers and graphic designers) in discussing website usability. In 2001-2002 the project focused on establishing current practice and identifying ways to cultivate it further. Project outcomes have included:

- *A survey of usability practice at the Open University*, via interviews and case studies with key usability personnel and course teams.
- *A set of Top 10 usability 'challenges'*. The result of a literature review and distilled collective experience, these 'challenges' identify key pedagogical usability issues that should be considered when developing and evaluating course-related websites.
- *Staff development workshops*, covering various aspects of usability, including usability concepts, types of evaluation, and user testing.
- *Development of a centralized website*,

giving internal access to usability resources and connecting the previously dispersed Open University usability community.

The second stage of the project (2002-2003) saw the development of the 'challenges' usability tool; this is now in the form of a document in which each challenge, or usability principle, is described in terms of risks, examples, suggested solutions, tests, and related research. The 'challenges' include aspects such as making the role of the website clear, organizing the site to meet learner needs and expectations, writing clearly for the medium, making navigation simple, ensuring editorial quality and consistency, providing printer-friendly versions of Web pages, keeping the site updated, and offering help on how to use the site.

The project has raised awareness of issues of pedagogical usability, whereas previously, people tended to confuse these with technical issues. It has also established that course team members have an important role to play in assessing the pedagogical usability of their course website. We have disseminated usability guidance through workshops and online staff development activities, and gathered evidence through interviews with students at one of the Open University's regional centers. A difficult aspect of the project was arranging the faculty-based workshops, not because of a lack of interest, but rather due to the difficulties of getting access to course teams at exactly the point when they are ready to consider issues of website usability. Finally, we have investigated student ratings for websites in the University's Annual Courses Survey (a questionnaire sent out to a large sample of students across the University). This analysis identified some striking differences between students' ratings for course websites across different faculties, which

we plan to follow up with further research.

Usability of E-Books

The publishers Taylor and Francis (2003) enthusiastically describe e-books as "quite simply, one of the most exciting innovations in the history of publishing," and suggest that e-books "extend and enlarge" the reading experience — an echo of Preece et al.'s definition of interaction design ("enhance and extend"), quoted above. Not much research data is available yet to support such claims, but the potential cannot be denied. Schcolnik's (2001) doctoral project is one of the most substantial pieces of research, concerning the reading strategies of adult users of e-book readers. There has also been a growing awareness of how e-books can relate to the needs to mobile learners, e.g., Simon (2001) has focused on science students who wish to use their travel time to campus productively.

As part of a project on e-book production and deployment, funded by an Open University initiative in e-learning in 2002-2003, we undertook a study of e-book use by students, conducted jointly with the e-books team in the Open University's Learning and Teaching Solutions unit. The aims of the student evaluation were to find out whether students welcomed the possibility of having course materials in e-book format, what problems were encountered, and how they were overcome. We were also interested to know how e-books change the learning experience. E-books were created from existing printed course materials, and students could download the e-book files from their course website in addition to receiving the printed materials. To read the e-books, they were expected to use the Adobe Acrobat E-book Reader software, and could make use of its facilities for managing a personal library of e-books, making different kinds of

annotation and bookmarking, and hearing the text read aloud.

Data was collected by means of two questionnaires and direct observations. Results from the questionnaires indicated that respondents were mostly positive about the provision of course materials in e-book form; however, many emphasized that e-books should remain adjuncts to print materials, not replace them. Positive features of e-books singled out for mention included portability (being able to study in spare moments at work) and functions such as searching, cutting and pasting, printing extracts, and highlighting. Over half of the respondents used the e-books to study both from the computer screen and by printing out sections of materials. They mentioned printing sections to read on the train, studying on business trips on a laptop, and on holiday. In addition, some comments related broadly to pedagogical advantages of e-books: printing summaries for revision, easier referencing, and highlighting of information. On the other hand, some students wanted to reduce their use of the computer, citing reasons such as eye-strain and other family members' need to use it, or suggested that print materials were more portable, easier to highlight, and annotate. There were issues related to the size of some e-book files and consequent long download times via modem, and problems with navigability.

Direct observations of students enabled us to explore usability issues involved in accessing and using e-book materials, to look at how effectively students performed tasks, and to observe student reactions. Participants were asked to undertake a series of tasks which involved actions such as reading and skim-reading text, controlling the legibility of the text and how it is displayed on the page, and navigating to specific chapters and pages. They had to work with notes, highlighting, and bookmarks. They

were asked to find definitions (using the in-built dictionary), and to find occurrences of a word. Other actions involved printing a page, copying a quotation, and pasting it into Microsoft Word. The sessions were audio and video recorded, capturing images of the computer screen, participant's behavior, and mouse movement in the Data Capture Suite at the Institute of Educational Technology. All observation participants had trouble finding a page size and font size that they felt was satisfactory. As is the case with most application software, there is more than one way of performing any given action, and we noted that some students completed actions in ways that were less efficient. As certain software options were revealed only upon right-clicking, the participants missed several potentially useful options.

The study results were discussed in a university-wide workshop and in focus groups with course teams. Consequently, it was possible to make a number of recommendations. Among the chief ones were preserving availability of print texts alongside e-books, revising existing technical instructions to include advice on establishing satisfactory page display, and drawing attention to plagiarism issues in relation to 'copy and paste' operations. Course teams requested guidance on how the use of e-book functions related to pedagogical tasks and objectives. In the longer term, it will be necessary to consider usability issues of reading e-books on PDAs (handheld Personal Digital Assistants), building on previous experiences of student use of handheld devices (Waycott & Kukulska-Hulme, 2003).

Usability of Digital Video

The use of audio-visual material has been a part of the learning package delivered to students since the UK Open University began in 1969. A repository of digital video can be searched and accessed directly by

students, and rather than viewing complete programs, they can view specific clips or jump into key points within the video. According to Thornhill, Asensio, and Young (2002), digital video that can be viewed over the Internet — also known as ‘streaming video’ — can be “transformed from a method of delivering information to a focus of student and group activity” (Thornhill et al., 2002, p. 5), especially when it is integrated with other Web-based resources.

The Open University first explored the use of digital video by collaborating with Carnegie Mellon University on the Informedia-I Digital Video Library Project (Kukulska-Hulme, van der Zwan, Dipaolo, Evers, & Clarke, 1999). The project evaluation had usability as its main focus. Data was collected by way of hands-on sessions, questionnaires, and group discussions that were audiotaped. Key findings were that the system was easy to use in certain respects, e.g., to perform a simple search or play a video clip, but it became less easy to use when trying to carry out a meaningful task and understand what the system was doing. Despite fairly high levels of computer experience and confidence, participants were unfamiliar with the terminology used in the Informedia system and repeatedly used their own terminology to describe aspects of the system. There were a number of usability issues, e.g., limited feedback about search outcomes, no bookmarking facility, insufficient labeling of buttons, and difficulties in customizing the interface. Following on from this project, it was recommended that a program of work be undertaken to investigate the use of digital video technology in a range of working environments to assess its full potential. As a result of this, the DiVA (Digital Video Applications) research project was created. The DiVA system uses Virage Videologger software to digitize content and Virage Solutions Server to deliver the con-

tent via a Web browser interface. The Virage software has been customized to meet the specific needs of the Open University. The project is funded by the Open University through its Learning and Teaching Strategy and the Development Strategy Group. DiVA aims to evaluate the use of digital video within the contexts of course production, resource-based learning, library processes, footage sales, and use by students with disabilities.

The first evaluation of the DiVA system was conducted in 2002. The main aims were to investigate the usability of the system and to gather some initial feedback with respect to course production and potential student use. An observation study was carried out in the Data Capture Suite at the Institute of Educational Technology. The ability to search and choose video clips right across university course materials was felt to be extremely valuable. Areas where users felt they needed clarification included:

- *Terminology*: e.g., the term ‘typo’ in the user interface, which conveyed the idea of an error to the users, rather than a function for looking for similar spellings of search words.
- *Level of description*: More description was needed to determine whether or not to access a particular clip.
- *What is searched*: It was not always clear to the user what DiVA was searching, e.g., in the case of a ‘subject headings’ search, users were looking for the term in the transcript, when in fact the system is doing a fielded search of the database.
- *Transcript display*: Users were confused by the way this displayed on the Media Player screen. The transcript scrolled off screen as the words were spoken.

Where possible, the user interface has subsequently been amended to take into

account user feedback. For those areas where we are unable to change the interface, we will provide detailed help pages and user instructions. An accessibility study with students with disabilities is planned for 2004.

CONCLUSIONS

We are continuing to work to provide leadership and guidance on educational design, evaluation, and specifically, pedagogical usability — a concept not yet widely understood in the world of e-learning. Our experience of usability studies with a range of technologies has taught us the importance of interpreting usability in the context of academic study and pedagogical tasks, and it has highlighted that for our students, print materials continue to have value alongside materials in electronic form. Our aim must be to create user experiences that “enhance and extend” the way students work, communicate, and interact.

REFERENCES

- Kukulska-Hulme, A., van der Zwan, R., Dipaolo, T., Evers, V., & Clarke, S. (1999). An evaluation of the Informedia Digital Video Library System at the Open University. *Journal of Educational Media*, 24(2), 131-136.
- Laurillard, D. (2002). *Rethinking university teaching: A conversational framework for the effective use of learning technologies* (2nd edition). London, New York: Routledge.
- Muir, A., Shield, L., & Kukulska-Hulme, A. (2003). The pyramid of usability: A framework for quality course websites. *Proceedings of the EDEN 12th Annual Conference of the European Distance Education Network, The Quality Dialogue: Integrating Quality Cultures in Flexible, Distance and eLearning* (pp. 188-194), Rhodes, Greece, June 15-18.
- Nielsen, J. (2001). Just how important is usability in e-learning? *eLearning Post*. Accessed December 27, 2003, from: <http://www.elearningpost.com/features/archives/001015.asp>
- Nielsen, J. (2003). *Useit.com*. Accessed December 27, 2003, from: <http://www.useit.com/>
- Preece, J., Rogers, Y., Sharp, H., Benyon, D., Holland, S., & Carey, T. (1994). *Human-Computer Interaction*. Harlow: Addison-Wesley.
- Preece, J., Rogers, Y., & Sharp, H. (2002). *Interaction design: Beyond Human-Computer Interaction*. New York: John Wiley & Sons.
- Scholnik, M. (2001). *A study of reading with dedicated e-readers*. PhD dissertation. Accessed April 7, 2003, from: <http://12.108.175.91/images/ebookweb/survey.miriam.scholnik.pdf>.
- Shield, L., & Kukulska-Hulme, A. (2003). Language learning websites: Designing for usability. Paper presented at *EUROCALL'03: New literacies in language learning and teaching*, University of Limerick, Ireland, September 3-6.
- Simon, E.J. (2001). Electronic textbooks: A pilot study of student e-reading habits. Institute for Cyberinformation. Future of Print Media Journal, Kent State University. Accessed December 27, 2003, from: <http://www.futureprint.kent.edu/articles/simon01.htm>
- Taylor and Francis. (2003). *eBooks—the word is out*. Publisher's brochure.
- Thornhill, S., Asensio, M., & Young, C. (2002). *Video streaming: A guide for educational development*. The JISC Click and Go Video Project, Manchester.
- Waycott, J., & Kukulska-Hulme, A. (2003). Students' experiences with PDAs for reading course materials. *Personal and Ubiquitous Computing*, 7(1), 30-43.